

## IMPACT OF NAD83 ADOPTION

### Introduction

On June 6, 1994, Alberta survey control marker coordinates referred to the North American Datum 1983 (NAD83) was officially adopted. This datum supersedes the North American Datum 1927 (NAD27), the standard since the early 1930s. This fact sheet reviews the impact of the new datum on survey control users and others dealing with position-based data.

### Datum Differences

The ellipsoid associated with NAD27 is Clarke's 1866 ellipsoid. The ellipsoid associated with NAD83 is the Geodetic Reference System 1980. The dimensions of these two ellipsoids are summarized in Table 1. Compared to NAD27, NAD83 is a better model of the earth's geometry and is more compatible with modern satellite-based navigation systems. For NAD27, the ellipsoid's position was defined by the coordinates of a point in Kansas used in the NAD27 continental readjustment. For NAD83, the ellipsoid is centred at the earth's centre of mass as defined by the Bureau International de l'Heure in 1984. The parameters that define NAD83 are also compatible with the World Geodetic System 1984, the coordinate system associated with the Global Positioning System (GPS).

Datum	Semi-major	Semi-minor
NAD27	6 378 206.4	6 356 583.8
NAD83	6 378 37.0	6 356 752.314

### Coordinate Differences

On average, the NAD83 coordinates of Alberta Survey Control Markers (ASCMs) differ from current NAD27 values by approximately 0.2 arc-seconds (or 6 to 7 m) northerly in latitude, and approximately 3.6 arc-seconds (or 20 m) westerly in longitude. Because of the change in ellipsoid dimensions, transverse Mercator plane coordinates change approximately 225 m northerly and 70 m westerly. Note that these numbers are averages; the actual change varies throughout the province.

### Federal Adoption

The NAD83 datum was adopted as the official national datum by the U.S. government in 1989, and the Canadian government in 1990. Because of Canadian adoption, NAD83 is the official datum for all federal surveying, mapping, charting and position-based information systems.

### Provincial Adoption

In Alberta, the Resource Information Management Branch adopted and published NAD83 coordinates for ASCMs on June 6, 1994. After this date, only NAD83 coordinates are rigorously computed for new ASCMs. Although NAD27 coordinates are available for new markers, these coordinates are actually "transformed" from NAD83 using version two (NTv2) of the National Transformation. Version two of the National Transformation is promoted as the standard method for transforming coordinates between NAD27 and NAD83. Since August 1995, base mapping products currently available from the Geodetic Control have been either transformed to, or recomputed on, NAD83.

### Impact on Land Surveys

In Alberta, plans of survey intended to be registered pursuant to the Surveys Act and Survey Regulation will be affected by the adoption of NAD83. A NAD83 transition plan has been developed by the Director of Surveys office and the Alberta Land Surveyors Association (ALSA), and incorporated in the ALSA Manual of Standard Practice. For more information, please contact the Director of Surveys office at (780) 427-3143 or fax (780) 427-1493.

### Phase-out of NAD27

Survey control users and others dealing with position-based data should consider adopting NAD83. Data referenced to NAD83 will be free of the distortion associated with NAD27. Rigorous accuracy qualifiers will also be available for NAD83 survey control coordinates in Alberta. Although the Geodetic Control will continue to make NAD27 coordinates available for ASCMs, NAD27 survey control coordinates has not been rigorously maintained since June 1, 1994. Eventually, any position-based data that remains referenced to NAD27 will become dated and difficult to integrate with other data.

### More Information

This fact sheet is one of a series published by Lands Division, Geodetic Control Unit. For more information, please visit our web site at: [Geodetic Control Unit](#) or contact us at (780) 422-1291 or fax (780) 427-1493.